Abstract

Isolation and Differentiation of Neural Stem and Progenitor Cells from the Adult Mouse Brain and Evaluation the effects of 2, 4Dichlorophenoxyacetic Acid (2, 4-D) on these cells.

Background &Objectives*:* Adult neural stem cells are a class of undifferentiated cells that are able to differentiate into neural cells in the adult nervous system and opened the door to treatment of degenerative diseases of CNS and spinal cord injury.2,4-D is a hormonal herbicide that have adverse effects including neurotoxicity on mammals. Considering to the importance of issue, in this study we survay the isolation and differentiation of neural stem cells from the adult mouse brain by neurosphere assay (NSA) and evaluate the effects of 2,4-D herbicide on this cells.

Material and Methods: The rostral part of the subventricular zone (SVZ) of the lateral ventricles in the adult mice was dissected and dissociated into single cell suspension and cultured using NSA. After seven days in culture, multipotent cellular colonies that named neurosphers were formed which made so many neurospheres by following passages. The differentiation of neural stem cells into the adult neural cells was accomplished by plating the neurosphere-derived cells in differentiating media.

Immunofluorescence and specific markers, MAP2 for neuron and GFAP for astrocyte, were used for identification of the adult neural cells. In order to evaluate the effect of 2,4-D on stem cells, neural stem cells derived from neurosphere were treated with different concentration of 2,4-D and then analyzed Using MTT Assay.

Results: The cell suspension obtained from the rostral part of the SVZ of the lateral ventricles generated multipotential colonies, called neurospheres, 7 to 10 days post- incubation. The multipotentiality of the neurospheres was shown by plating them in differentiating media and generating adult neural cells including neuron, astrocyte and oligodendrocyte. Our results showed that the cell death was significantly increased in high concentration of 2,4-D.

Conclusion*:* Owing to their rarity and paucity of neural stem cell specific markers, the NSA

is a common and selective method for isolating and understanding the biology of embryonic and adult neural stem cells. 2,4-D herbicide has toxic effect on neural stem cells derived from neurosphere assay.

Key words: Neural stem cell; Subventricular Zone; Neurosphere; 2,4-D